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Opilionids from Texas Caves (Opiliones, Phalangodidae)

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Intensive collecting during the past few years has demonstrated the presence of an interesting and varied fauna in Texas caves. While many of these caves, especially those of west Texas, appear to be too dry for opilionids, those in the vicinity of Austin, San Antonio, and San Marcos are inhabited by at least four different cavernicolous species. These are all members of the family Phalangodidae and represent two genera. One of these, *Texella,* shows affinities to the phalangodids of more northern areas. Members of the other genus, *Hoplobunus,* are closely related to forms found in northern Mexico, where there are other cave-adapted species of this genus.

This interesting collection was made available for our study by Dr. James Reddell of the Texas Speleological Survey of Austin. The types are in the collection of the American Museum of Natural History.

All measurements are given in millimeters.

SUBORDER LANIATORES THORELL

PHALANGODIDAE SIMON

HOPLOBUNUS BANKS

Hoplobunus Banks, 1900, p. 200. Pickard-Cambridge, 1904, p. 585. Roewer,

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1912, p. 149; 1923, p. 112. GOODNIGHT AND GOODNIGHT, 1942b, p. 1; 1945, p. 3; 1953, pp. 19–20.

Haehnelia ROEWER, 1915, p. 21; 1923, p. 112.

Isaeus SØRENSEN, 1932, pp. 275–276.

Serrobunus GOODNIGHT AND GOODNIGHT, 1942b, p. 2; 1945, p. 3.

Chinquipellobunus GOODNIGHT AND GOODNIGHT, 1944, p. 1; 1945, p. 3.

Phalangodids with common eye tubercle usually only slightly removed from anterior margin of cephalothorax; eye tubercle variously armed above. Abdominal scute with five areas; first without median line. Tarsi of third and fourth legs simple, with untoothed double claws. Femur of first leg normal, not unusually elongate or heavily spined. Tarsus of first leg with five or more segments. Distitarsus of first tarsus with two segments, second with three. Metatarsi not divided into astragali and calcanea. Maxillary lobe of second coxa much reduced, without any ventral projection. Usually robust animals, with long heavy legs and with spiracle widely expanded. Secondary sexual characters of male variable.

TYPE SPECIES: *Hoplobunus barretti* Banks.

Hoplobunus madlae, new species

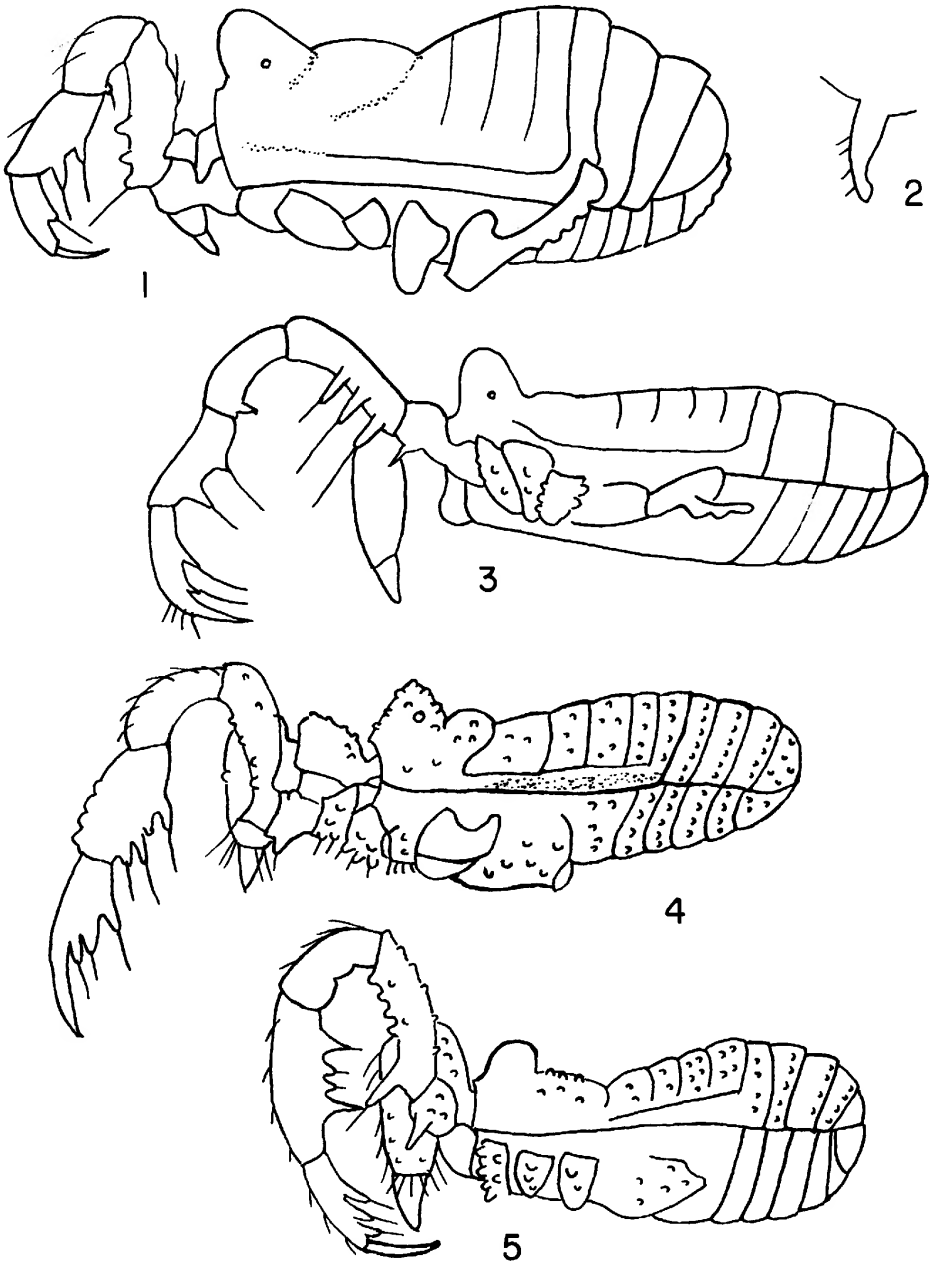
Figure 5

MALE HOLOTYPE: Total length of body, 3.9 mm.; cephalothorax, 1.2 mm.; width of body at widest portion, 3.3 mm.

	I	II	III	IV
Trochanter	0.5	0.6	0.6	0.6
Femur	4.2	5.4	4.1	5.7
Patella	1.0	1.4	0.9	1.2
Tibia	2.7	5.0	2.9	3.8
Metatarsus	4.2	5.6	4.7	5.9
Tarsus	3.0	7.5	2.9	3.8
Total	15.6	25.5	16.1	21.0

Cephalothorax somewhat granulate, with few scattered tubercles over surface. Eye tubercle extremely close to anterior margin, rounded above, smooth except for few very small granulations. Lacking eyes. Anterior margin with anterior median spine between paired chelicerae. Dorsum with five distinct areas, and with very small tubercles arranged more or less in rows on their posterior margins. Anal operculum, venter, and coxae smooth except for few very tiny tubercles, more prominent on coxae. First coxa with ventral row of spines. Spiracles visible.

Legs: Trochanters, femora, patellae, and tibiae with small tubercles;



FIGS. 1, 2. *Texella reddelli,* new species. 1. Lateral view of male holotype. 2. Lateral view of spine projecting ventrally from the genital operculum.
FIG. 3. *Texella mulaiki* Goodnight and Goodnight, lateral view of male.
FIG. 4. *Hoplobunus russelli,* new species, lateral view of male holotype.
FIG. 5. *Hoplobunus madlae,* new species, lateral view of male holotype.

metatarsi and tarsi armed only with hairs. Metatarsi not divided into astraguli and calcanei. Tarsal segments: 6-15-7-7. Distitarsus of first tarsus with two segments, second with three.

Palpus: Trochanter, 0.5 mm. long; femur, 1.8; patella, 0.8; tibia, 1.2; and tarsus, 1. Total length, 5.3 mm. Palpus armed retrolaterally as shown in figure 5. Prolaterally trochanter, femur, and patella armed only with few small tubercles. Metatarsus and tarsus armed similarly to retrolateral margin.

Chelicerae much enlarged, well armed with hair-tipped tubercles.

Color light reddish brown; appendages lighter yellowish brown.

FEMALE: Total length of body, 4.1 mm.; cephalothorax, 1.8 mm.; width of body at widest portion, 2.7 mm.

Similar in appearance to male, but without enlarged chelicerae.

TYPE LOCALITY: Male holotype from Rambie's Cave, Uvalde County, Texas, April 6, 1963, collected by James Reddell and David McKenzie.

TEXAS RECORDS: *Bexar County:* Madla's Cave, October 6, 1963 (James Reddell, David McKenzie, and Royce Bellinger); July 6, 1959 (J. R. Reid). Station B Cave, October 30, 1963 (David McKenzie). *Uvalde County:* Indian Creek Cave, November 3, 1962 (James Reddell); November 28, 1962 (A. C. Fabergé). *Kinney County:* Web Cave, April 5, 1963 (William Russell). *Real County:* Skeleton Cave, August 18, 1963 (James Reddell and David McKenzie). *Val Verde County:* H. T. Mier's Cave, August 29, 1964 (David McKenzie and Terry Raines). Davy Crockett Cave, October 18, 1964 (James Reddell). Helotes Hilltop Cave, August 30, 1964 (Orion Knox, Jr.). *Edwards County:* Dunbar Cave, October 17, 1964 (David McKenzie and John Porter). *Kendall County:* Cave without a name, June 6, 1960 (T. C. Barr).

Hoplobunus russelli, new species

Figure 4

MALE HOLOTYPE: Total length of body, 4.7 mm.; cephalothorax, 1.3 mm.; width of body at widest portion, 2.6 mm.

	I	II	III	IV
Trochanter	0.4	0.6	0.7	0.6
Femur	2.6	4.3	3.4	4.4
Patella	0.9	1.2	1.9	1.2
Tibia	1.9	3.9	2.4	3.3
Metatarsus	2.6	4.4	3.8	5.0
Tarsus	1.7	4.0	2.0	2.2
Total	10.1	18.4	14.2	16.7

Cephalothorax thickly covered with small tubercles; median anterior margin with projection between bases of chelicerae. Eye tubercle rounded, only slightly removed from anterior margin, covered with tubercles, with small eyes (fig. 4). Dorsum with five distinct areas; first without median line, covered thickly with small tubercles arranged more or less in rows on fifth area and free tergites. Dorsal portion of anal operculum thickly covered with tubercles. Free sternites with rows of tubercles; coxae tuberculate. Rows of teeth on anterior margin of first coxa and anterior and posterior margins of third coxa. Fourth coxa expanded. Spiracles clearly visible.

Legs tuberculate, with femur, patella, tibia, and metatarsus of third and fourth legs strongly tuberculate. Femora of first and second legs only slightly tuberculate. Metatarsi not divided into astraguli and calcanea. Tarsal segments: 5-5-6-5. Distitarsus of first tarsus with two segments, second with three.

Palpus: Trochanter, 0.4 mm. long; femur, 1.4; patella, 0.7; tibia, 0.9; and tarsus, 1.1. Total length, 4.5 mm. Palpus armed retrolaterally as shown in figure 4. Prolaterally, femur and patella unarmed, tibia has four hair-tipped tubercles, tarsus has three.

Chelicerae enlarged, first segment with dorsal enlargement; distal segment with anterior dorsal enlargement.

Entire animal reddish brown, appendages somewhat lighter.

FEMALE: Total length of body, 4.8 mm.; cephalothorax, 1.2 mm.; width of body at widest portion, 2.8 mm.

Similar in appearance to male, but without enlarged chelicerae.

TYPE LOCALITY: Male holotype from Diablo Cave, Val Verde County, Texas, collected by James Reddell and David McKenzie on August 10, 1963. It was found in mud about 2000 feet from the cave entrance.

TEXAS RECORDS: *Val Verde County:* Calyx Hole, entrance to Diablo Cave, August 11, 1963, about 6000 feet from the natural entrance (James Reddell and David McKenzie). Ladder Cave, August 10, 1963 (James Reddell and David McKenzie). *Medina County:* Valdina Farms Sinkhole, January 2, 1964 (James Reddell, John Porter, and David McKenzie).

TEXELLA GOODNIGHT AND GOODNIGHT

Texella GOODNIGHT AND GOODNIGHT, 1942a, p. 10.

Phalangodids with common eye tubercle only very slightly removed from anterior margin of cephalothorax; eye tubercle usually unarmed above. Abdominal scute with five areas, first without median line. Tarsi of third and fourth legs simple, with untoothed double claws. Femur of

first leg normal, not unusually elongate or heavily spined. Tarsus of first leg with three or four segments. Distitarsus of first tarsus with two segments, of second with three. Metatarsi not divided into astraguli and calcanea. Spiracles partially covered by coxae.

Secondary sexual characters of male variable, but often consisting of spur on fourth coxa.

GENOTYPE: *Texella mulaiki* Goodnight and Goodnight.

Texella mulaiki Goodnight and Goodnight

Figure 3

Texella mulaiki GOODNIGHT AND GOODNIGHT, 1942a, p. 10, figs. 34–36.

MALE: Total length of body, 2 mm.; cephalothorax, 0.6 mm.; width of body at widest portion, 1.4 mm.

	I	II	III	IV
Trochanter	0.2	0.3	0.2	0.4
Femur	1.4	2.3	1.4	2.3
Patella	0.5	0.6	0.3	0.5
Tibia	1.5	2.0	1.3	1.7
Metatarsus	1.5	2.3	1.8	2.3
Tarsus	1.1	2.4	1.4	1.9
Total	6.2	9.9	6.4	9.1

Cephalothorax smooth; eye tubercle on anterior margin. Eye tubercle bluntly rounded, forward-pointing cone, without eyes, without tuberculations. Dorsum with five distinct areas; first without median line. Dorsum and free tergites clothed only with granulations. Second maxillary lobe without downward-pointing spine, free sternites smooth except for small granulations. Genital operculum with small, curved projection. Coxae smooth, rows of teeth on anterior and posterior margins of third coxa. Spiracles partially covered by fourth coxa.

Trochanters of legs smooth; fourth trochanter with distal projection bearing several tubercles on posterior margin. Remainder of segments of legs armed only with hairs. Tarsal segments: 4-6-5-5, but may be 4-7-5-5. Distitarsus of first tarsus with two segments, second with three.

Chelicerae only very slightly enlarged.

Palpus: Trochanter, 0.2 mm. long; femur, 0.8; patella, 0.3; tibia, 0.5; and tarsus, 0.7. Total length, 2.5 mm. Palpus armed retrolaterally as shown in figure 3. Prolaterally femur with median apical spine, patella with two small spines, tibia and tarsus each spined as retrolateral margin.

Entire animal light yellowish brown.

FEMALE: Total length of body, 2.4 mm.; cephalothorax, 0.6 mm.;

width of body at widest portion, 1.5 mm.

Similar in appearance to male, but without projections on fourth trochanter and genital operculum.

TYPE LOCALITY: Female holotype from Hays County, Texas, collected by D. and S. Mulaik on April 15, 1939.

In the original description of this species, we stated that the holotype was a male. These additional collections have contained males, and we now realize that our holotype is a female.

TEXAS RECORDS: *Travis County:* Cottrell Cave, March 11, 1964 (William Russell). *Williamson County:* Man-with-a-Spear Cave, August 24, 1963 (James Reddell and William Russell); Beck's Tin Can Cave, November, 1962 (James Reddell).

Texella reddelli, new species

Figures 1, 2

MALE HOLOTYPE: Total length of body, 2 mm.; cephalothorax, 0.8 mm.; width of body at widest portion, 1.4 mm.

	I	II	III	IV
Trochanter	0.2	0.2	0.4	0.4
Femur	1.0	1.0	1.4	1.4
Patella	0.4	0.5	0.4	0.5
Tibia	0.7	1.3	0.8	1.1
Metatarsus	0.9	1.4	1.1	1.4
Tarsus	0.6	1.2	1.4	1.1
Total	4.0	5.6	5.5	5.9

Cephalothorax (fig. 1) smooth, slightly arched behind eye tubercle. Eye tubercle a rounded cone, situated slightly away from anterior margin, without eyes. Dorsal portion of abdomen smooth, with five areas with somewhat indistinct boundaries. First area without a median line. Free tergites smooth, without spines or tubercles. Venter granulate, with scattered hairs. Coxae smooth except for row of small tubercles on ventral margin of first coxa. Genital operculum with large, ventrally pointing spine (fig. 2).

Legs smooth. Fourth trochanter with large, distal, bluntly rounded projection at distal posterior margin. Projection with row of tubercles along posterior margin. Other trochanters smooth. Tarsal segments: 3-5-5-6. Distitarsus of first tarsus with two segments, second with three.

Palpus: Trochanter, 0.2 mm. long; femur, 0.7; patella, 0.4; tibia, 0.5; and tarsus, 0.4; total length, 2.2 mm. Palpus armed retrolaterally as shown in figure 1. Prolaterally, femur with apical median spine, patella with two median spines, tibia with three, and tarsus with two.

Chelicerae normal, with only scattered hairs.

Entire animal light yellowish brown, very slightly pigmented.

FEMALE: Total length of body, 2 mm.; cephalothorax, 1.1 mm.; width of body at widest point, 1.4 mm.

Female similar in appearance to male, but lacking projections on genital operculum and fourth trochanter.

TYPE LOCALITY: Male holotype from Pine Creek Cave, Travis County, Texas, October 2, 1963, collected by James Reddell and David McKenzie.

TEXAS RECORDS: *Travis County:* Tooth Cave, October 2, 1963 (James Reddell and David McKenzie); Bee Creek Cave, October 2, 1963 (James Reddell and David McKenzie); Weldon Cave, January 7, 1965 (William Russell). *Williamson County:* Bone Cave, August 4, 1963 (James Reddell).

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